

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

KANAYA et al.

Application No. Unassigned Art Unit: Unassigned

Filed: October 10, 2001 Examiner: Unassigned

For: HIGH FREQUENCY
SEMICONDUCTOR
INTEGRATED CIRCUIT
CAPABLE OF SWITCH-
ING BETWEEN
CHARACTERISTICS
THEREOF

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D. C. 20231

Dear Sir:

Prior to the examination of the above-identified patent application, please enter the following amendments and consider the following remarks.

IN THE TITLE:

Replace the title with:

HIGH FREQUENCY SEMICONDUCTOR INTEGRATED CIRCUIT CAPABLE OF
SWITCHING BETWEEN CHARACTERISTICS

IN THE SPECIFICATION:

Replace the paragraph beginning at page 1, line 13, with:

Main circuit 610 includes an input terminal 6101, a transistor 6102, transmission lines 6103 and 6104, and an output terminal 6105. Transistor 6102 is connected to input terminal 6101 at its gate terminal, to a ground node 7 at its source terminal, and to transmission line 6103 at its drain terminal. Transistor 6102 is, to be specific, a field effect transistor such as a MOS FET, or a MES FET (Metal Semiconductor Field Effect Transistor), HEMT (High Electron Mobility Transistor) or HBT (Heterojunction Bipolar Transistor) made from GaAs.

Replace the paragraph beginning at page 2, line 18, with:

In prior art high frequency semiconductor integrated circuit 600, however, circuit block 620 is connected to node 6106 of main circuit 610; therefore, when only main circuit 610 is desired to be used, or when a high frequency semiconductor integrated circuit having a different performance is requested, a problem arises since separate circuit patterns are required. That is, when passive circuits 6201 and 6202, each constituted of a passive element optimized for output matching, are incorporated into circuit block 620, only main circuit 610 cannot be used and further, high frequency semiconductor integrated circuit 600 cannot be differently used as a high frequency semiconductor integrated circuit for achieving efficiency matching.

Replace the paragraph beginning at page 6, line 22, with:

Fig. 21 is a plan view showing a specific example of one of two high frequency semiconductor integrated circuits shown in Fig. 20; and

IN THE CLAIMS:

Replace the indicated claims with:

1. (Amended) A high frequency semiconductor integrated circuit comprising:
a main circuit having an active element and a first pad;
a circuit block of a passive element;
a second pad connected to said circuit block; and
a wire connecting said first pad to said second pad.
2. (Amended) The high frequency semiconductor integrated circuit according to claim 1, wherein said main circuit includes an input terminal and an output terminal and said active element and said first pad are located between said input terminal and said output terminal.
3. (Amended) The high frequency semiconductor integrated circuit according to claim 2, wherein said passive element has an impedance that decreases with an increase in frequency of an input signal input to said input terminal.
4. (Amended) The high frequency semiconductor integrated circuit according to claim 2, wherein said circuit block includes an interconnect connected to said second pad and wherein said wire and said interconnect have lengths totaling one-fourth of a wavelength of a high frequency signal input to said input terminal.
5. (Amended) A high frequency semiconductor integrated circuit comprising:
a main circuit having an active element and a main pad;
plural circuit blocks, each circuit block constituted of a passive element;
plural connection pads corresponding to respective plural circuit blocks; and
a wire for connecting said main pad to one of said plural connection pads.

6. (Amended) The high frequency semiconductor integrated circuit according to claim 5, wherein said main circuit includes an input terminal and an output terminal and said active element and said main pad are located between said input terminal and said output terminal.

7. (Amended) The high frequency semiconductor integrated circuit according to claim 6, wherein said plural circuit blocks include:

a first circuit block for adjusting an impedance of said main circuit to a first impedance;

a second circuit block for adjusting the impedance of said main circuit to a second impedance; and

a third circuit block for adjusting the impedance of said main circuit to a third impedance.

8. (Amended) The high frequency semiconductor integrated circuit according to claim 7, wherein

said first circuit block is constituted of a first capacitor having a first capacitance and connected to a ground node at a first end of said first capacitor and a first connection pad at a second end of said first capacitor,

said second circuit block is constituted of a second capacitor having a second capacitance and connected to the ground node at a first end of said second capacitor and a second connection pad at a second end of said second capacitor, and

said third circuit block is constituted of a third capacitor having a third capacitance and connected to the ground node at a first end of said third capacitor and a third connection pad at a second end of said third capacitor.

10. (Amended) The high frequency semiconductor integrated circuit according to claim 9, wherein

said first high frequency semiconductor integrated circuit comprises a main circuit having an active element and a circuit block having a passive element; and

said second high frequency semiconductor integrated circuit includes only a main circuit having an active element.

11. (Amended) The high frequency semiconductor integrated circuit according to claim 10, wherein

said second high frequency semiconductor integrated circuit includes a first main circuit having a first active element and a first pad, and

said first high frequency semiconductor integrated circuit includes:

a circuit block having a passive element;

a second pad connected to said circuit block;

a second main circuit having a third pad for connecting said first and second pads to each other, and a second active element; and

a wire for connecting said second pad to said third pad, wherein said main wire connects said first pad to said third pad.

12. (Amended) The high frequency semiconductor integrated circuit according to claim 11, wherein

said first main circuit further includes:

an interconnect connected at a first end to said first pad and at a second end to said first active element; and

an output terminal connected to said first active element, and

said second main circuit further includes:

an interconnect connected at a first end to said third pad and at a second end to said second active element; and

an input terminal connected to said second active element.

13. (Amended) The high frequency semiconductor integrated circuit according to claim 12, wherein said circuit block includes a passive element for matching an impedance of said first main circuit to an impedance of said second main circuit.

14. (Amended) The high frequency semiconductor integrated circuit according to claim 9, wherein

said first high frequency semiconductor integrated circuit includes only one main circuit having an active element, and

said second high frequency semiconductor integrated circuit includes only one circuit block having a passive element.

15. (Amended) The high frequency semiconductor integrated circuit according to claim 14, wherein

said first high frequency semiconductor integrated circuit includes a main circuit having an active element and a main pad,

said second high frequency semiconductor integrated circuit includes plural circuit blocks, each circuit block having a passive element, and

plural connection pads corresponding to respective plural circuit blocks, wherein said main wire connects said main pad to one of said plural connection pads.

IN THE ABSTRACT:

Replace the abstract with:

ABSTRACT OF THE DISCLOSURE

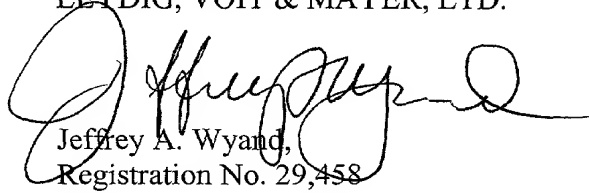
A high frequency semiconductor integrated circuit includes a main circuit, a circuit block, a pad, and a wire. The main circuit includes an input terminal, a transistor, transmission lines, a pad, and an output terminal. The circuit block includes a passive circuit and a capacitor. The pad is disposed close to the circuit block. The wire connects the pad to the pad included in the main circuit. In the high frequency semiconductor integrated circuit, the main circuit outputs an input signal input at the input terminal from the output terminal through the transistor, the transmission line, the pad, and another transmission line. As a result, the high frequency semiconductor integrated circuit can realize various performances and can be used in many applications.

REMARKS

The foregoing amendments are made to correct minor translational errors and to meet United States requirements as to form. No new matter is added.

Respectfully submitted,

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**AMENDMENTS TO SPECIFICATION, CLAIMS, AND
ABSTRACT MADE VIA PRELIMINARY AMENDMENT**

Amendments to the paragraph beginning at page 1, line 13:

Main circuit 610 includes an input terminal 6101, a transistor 6102, transmission lines 6103 and 6104, and an output terminal 6105. Transistor 6102 is connected to input terminal 6101 at ~~the its~~ gate terminal ~~thereof~~ and, to a ground node 7 at ~~the its~~ source terminal ~~thereof~~, and to transmission line 6103 at ~~the its~~ drain terminal ~~thereof~~. Transistor 6102 is, to be concrete specific, constituted of a field effect transistor such as a MOS transistor FET, or a MES FET (Metal Semiconductor Field Effect Transistor), HEMT (High Electron Mobility Transistor) or HBT (Heterojunction Bipolar Transistor) made from GaAs.

Amendments to the paragraph beginning at page 2, line 18:

In prior art high frequency semiconductor integrated circuit 600, however, circuit block 620 is connected to node 6106 of main circuit 610; therefore, when only main circuit 610 is desired to be used, or when a high frequency semiconductor integrated

circuit having a different performance is requested, a problem ~~arise~~ arises since separate circuit patterns are required. That is, when passive circuits 6201 and 6202, each constituted of a passive element optimized for output matching, are incorporated into circuit block 620, only main circuit 610 cannot be used and further, high frequency semiconductor integrated circuit 600 cannot be differently used as a high frequency semiconductor integrated circuit for ~~use in~~ achieving efficiency matching.

Amendments to the paragraph beginning at page 6, line 22:

Fig. 21 is a plan view showing ~~an concrete~~ a specific example of one of two high frequency semiconductor integrated circuits shown in Fig. 20; and

Amendments to the existing claims:

1. (Amended) A high frequency semiconductor integrated circuit comprising:
a main circuit having an active element and a first pad ~~therein~~;
a circuit block ~~constituted~~ of a passive element;
a second pad connected to said circuit block; and
a wire ~~to connect~~ connecting said first pad to said second pad.

2. (Amended) The high frequency semiconductor integrated circuit according to claim 1, wherein said main circuit includes an input terminal and an output terminal and said active element and said first pad are located between ~~an said input terminal and an~~ said output terminal.

3. (Amended) The high frequency semiconductor integrated circuit according to claim 2, wherein said ~~circuit block includes a~~ passive element ~~whose~~ has an impedance that decreases with an increase in frequency of an input signal ~~inputted at input to~~ said input terminal.

4. (Amended) The high frequency semiconductor integrated circuit according to claim 2, wherein said circuit block includes an interconnect connected to said second pad and ~~the sum of a length of wherein said wire and a length of said interconnect is equal to~~ have lengths totaling one-fourth of a wavelength of a high frequency signal inputted at input to said input terminal.

5. (Amended) A high frequency semiconductor integrated circuit comprising:
a main circuit having an active element and a main pad ~~therein~~;
plural circuit blocks, each circuit block constituted of a passive element;
plural connection pads ~~provided correspondingly~~ corresponding to said respective plural circuit blocks; and
a wire for connecting said main pad to one of said plural connection pads.

6. (Amended) The high frequency semiconductor integrated circuit according to claim 5, wherein said main circuit includes an input terminal and an output terminal and said active element, and said main pad are located between an said input terminal and an said output terminal.

7. (Amended) The high frequency semiconductor integrated circuit according to claim 6, wherein said plural circuit blocks include:

a first circuit block for adjusting an impedance of said main circuit to ~~be~~ a first impedance;
a second circuit block for adjusting ~~said the~~ impedance of said main circuit to ~~be~~ a second impedance; and
a third circuit block for adjusting ~~said the~~ impedance of said main circuit to ~~be~~ a third impedance.

8. (Amended) The high frequency semiconductor integrated circuit according to claim 7, wherein

said first circuit block is constituted of a first capacitor having a first ~~capacity~~, capacitance and connected to a ground node at ~~one a first end thereof of said first~~

capacitor and a first connection pad at ~~the other~~ a second end thereof of said first capacitor,

said second circuit block is constituted of a second capacitor having a second ~~capacity,~~ capacitance and connected to the ground node at ~~one a first end thereof~~ of said second capacitor and a second connection pad at ~~the other~~ a second end thereof of said second capacitor, and

said third circuit block is constituted of a third capacitor having a third ~~capacity,~~ capacitance and connected to the ground node at ~~one a first end thereof~~ of said third capacitor and a third connection pad at ~~the other~~ a second end thereof of said third capacitor.

10. (Amended) The high frequency semiconductor integrated circuit according to claim 9, wherein

said first high frequency semiconductor integrated circuit comprises a main circuit having an active element and a circuit block having a passive element; and

said second high frequency semiconductor integrated circuit includes only a main circuit having an active element.

11. (Amended) The high frequency semiconductor integrated circuit according to claim 10, wherein

said second high frequency semiconductor integrated circuit includes a first main circuit having a first active element and a first pad, and

said first high frequency semiconductor integrated circuit includes:

a circuit block having a passive element;

a second pad connected to said circuit block;

a second main circuit having a third pad for connecting said first and second pads to each other, and a second active element; and

a wire for connecting said second pad to said third pad, wherein said main wire connects said first pad to said third pad.

12. (Amended) The high frequency semiconductor integrated circuit according to claim 11, wherein

said first main circuit further includes:

an interconnect connected at a first end to said first pad ~~at one end thereof~~
and at a second end to said first active element ~~at the other end thereof~~; and

an output terminal connected to said first active element, and

said second main circuit further includes:

an interconnect connected at a first end to said third pad ~~at one end thereof~~
and at a second end to said second active element ~~at the other end thereof~~; and

an input terminal connected to said second active element.

13. (Amended) The high frequency semiconductor integrated circuit according to claim 12, wherein said circuit block includes a passive element for matching an impedance of said first main circuit to an impedance of said second main circuit.

14. (Amended) The high frequency semiconductor integrated circuit according to claim 9, wherein

said first high frequency semiconductor integrated circuit includes only a one main circuit having an active element, and

said second high frequency semiconductor integrated circuit includes only a one circuit block having a passive element.

15. (Amended) The high frequency semiconductor integrated circuit according to claim 14, wherein

said first high frequency semiconductor integrated circuit includes a main circuit having an active element and a main pad, ~~and~~

said second high frequency semiconductor integrated circuit includes plural circuit blocks, each circuit block having a passive element, and

plural connection pads ~~provided correspondingly~~ corresponding to said respective plural circuit blocks, wherein said main wire connects said main pad to one of said plural connection pads.

Amendments to the abstract:

ABSTRACT OF THE DISCLOSURE

A high frequency semiconductor integrated circuit includes a main circuit, a circuit block, a pad, and a wire. The main circuit includes an input terminal, a transistor, transmission lines, a pad, and an output terminal. The circuit block includes a passive circuit, and a capacitor. The pad is disposed close to the circuit block. The wire connects the pad to the pad included in the main circuit. In the high frequency semiconductor integrated circuit, the main circuit outputs an input signal ~~inputted~~ input at the input terminal from the output terminal through the transistor, the transmission line, the pad, and another transmission line. As a result, the high frequency semiconductor integrated circuit can realize various ~~kinds of its~~ performances and ~~thereby~~ can be used ~~to~~ in many applications.

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PENDING CLAIMS AFTER ENTRY OF PRELIMINARY AMENDMENT

1. A high frequency semiconductor integrated circuit comprising:
a main circuit having an active element and a first pad;
a circuit block of a passive element;
a second pad connected to said circuit block; and
a wire connecting said first pad to said second pad.
2. The high frequency semiconductor integrated circuit according to claim 1,
wherein said main circuit includes an input terminal and an output terminal and said
active element and said first pad are located between said input terminal and said output
terminal.
3. The high frequency semiconductor integrated circuit according to claim 2,
wherein said passive element has an impedance that decreases with an increase in
frequency of an input signal input to said input terminal.

4. The high frequency semiconductor integrated circuit according to claim 2, wherein said circuit block includes an interconnect connected to said second pad and wherein said wire and said interconnect have lengths totaling one-fourth of a wavelength of a high frequency signal input to said input terminal.

5. A high frequency semiconductor integrated circuit comprising:
a main circuit having an active element and a main pad;
plural circuit blocks, each circuit block constituted of a passive element;
plural connection pads corresponding to respective plural circuit blocks; and
a wire for connecting said main pad to one of said plural connection pads.

6. The high frequency semiconductor integrated circuit according to claim 5, wherein said main circuit includes an input terminal and an output terminal and said active element and said main pad are located between said input terminal and said output terminal.

7. The high frequency semiconductor integrated circuit according to claim 6, wherein said plural circuit blocks include:
a first circuit block for adjusting an impedance of said main circuit to a first impedance;
a second circuit block for adjusting the impedance of said main circuit to a second impedance; and
a third circuit block for adjusting the impedance of said main circuit to a third impedance.

8. The high frequency semiconductor integrated circuit according to claim 7, wherein
said first circuit block is constituted of a first capacitor having a first capacitance and connected to a ground node at a first end of said first capacitor and a first connection pad at a second end of said first capacitor,

said second circuit block is constituted of a second capacitor having a second capacitance and connected to the ground node at a first end of said second capacitor and a second connection pad at a second end of said second capacitor, and

said third circuit block is constituted of a third capacitor having a third capacitance and connected to the ground node at a first end of said third capacitor and a third connection pad at a second end of said third capacitor.

9. A high frequency semiconductor integrated circuit comprising:
a first high frequency semiconductor integrated circuit;
a second high frequency semiconductor integrated circuit; and
a main wire for connecting said first high frequency semiconductor integrated circuit to said second high frequency semiconductor integrated circuit.

10. The high frequency semiconductor integrated circuit according to claim 9, wherein

said first high frequency semiconductor integrated circuit comprises a main circuit having an active element and a circuit block having a passive element; and

said second high frequency semiconductor integrated circuit includes only a main circuit having an active element.

11. The high frequency semiconductor integrated circuit according to claim 10, wherein

said second high frequency semiconductor integrated circuit includes a first main circuit having a first active element and a first pad, and

said first high frequency semiconductor integrated circuit includes:

a circuit block having a passive element;

a second pad connected to said circuit block;

a second main circuit having a third pad for connecting said first and second pads to each other, and a second active element; and

a wire for connecting said second pad to said third pad, wherein said main wire connects said first pad to said third pad.

12. The high frequency semiconductor integrated circuit according to claim 11,
wherein

said first main circuit further includes:

an interconnect connected at a first end to said first pad and at a second end
to said first active element; and

an output terminal connected to said first active element, and

said second main circuit further includes:

an interconnect connected at a first end to said third pad and at a second
end to said second active element; and

an input terminal connected to said second active element.

13. The high frequency semiconductor integrated circuit according to claim 12,
wherein said circuit block includes a passive element for matching an impedance of said
first main circuit to an impedance of said second main circuit.

14. The high frequency semiconductor integrated circuit according to claim 9,
wherein

said first high frequency semiconductor integrated circuit includes only one main
circuit having an active element, and

said second high frequency semiconductor integrated circuit includes only one
circuit block having a passive element.

15. The high frequency semiconductor integrated circuit according to claim 14,
wherein

said first high frequency semiconductor integrated circuit includes a main circuit
having an active element and a main pad,

said second high frequency semiconductor integrated circuit includes plural circuit
blocks, each circuit block having a passive element, and

plural connection pads corresponding to respective plural circuit blocks, wherein
said main wire connects said main pad to one of said plural connection pads.